Joint Pub 3-01.1

Aerospace Defense of North America

1 November 1996

PREFACE

1. Scope

This publication provides the guidance necessary to plan, coordinate, and execute joint aerospace defense of North America. It provides the doctrinal basis for how joint forces approach the air defense, ballistic missile defense, and space defense operations that support aerospace defense of North America.

2. Purpose

This publication has been prepared under the direction of the Chairman of the Joint Chiefs of Staff. It sets forth doctrine to govern the joint activities and performance of the Armed Forces of the United States in joint operations and provides the doctrinal basis for US military involvement in multinational and interagency operations. It provides military guidance for the exercise of authority by combatant commanders and other joint force commanders and prescribes doctrine for joint operations and training. It provides military guidance for use by the Armed Forces in preparing their appropriate plans. It is not the intent of this publication to restrict the authority of the joint force commander (JFC) from organizing the force and executing the mission in a manner the JFC deems most appropriate to ensure unity of effort in the accomplishment of the overall mission.

3. Application

a. Doctrine and guidance established in this publication apply to the commanders of combatant commands, US Element NORAD, subunified commands, joint task forces, and subordinate components of these commands. These principles and guidance also may apply when significant forces of one Service are attached to forces of another Service or when significant forces of one Service support forces of another Service.

b. The guidance in this publication is authoritative; as such, this doctrine (or JTTP) will be followed except when, in the judgment of the commander, exceptional circumstances dictate otherwise. If conflicts arise between the contents of this publication and the contents of Service publications, this publication will take precedence for the activities of joint forces unless the Chairman of the Joint Chiefs of Staff, normally in coordination with the other members of the Joint Chiefs of Staff, has provided more current and specific guidance. Commanders of forces operating as part of a multinational (alliance or coalition) military command should follow multinational doctrine and procedures ratified by the United States. For doctrine and procedures not ratified by the United States, commanders should evaluate and follow the multinational command's doctrine and procedures, where applicable.

For the Chairman of the Joint Chiefs of Staff:

DENNIS C. BLAIR
Vice Admiral, US Navy
Director, Joint Staff

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Overview

The proliferation of advanced weapons and technology may bring North America within the lethal reach of emerging regional military powers.

The survival and security of North America may depend on the effective execution of aerospace defense against weapons of mass destruction and an assortment of conventional weapons. **The principal objective of aerospace defense is the protection of North America, its people, and other valuable assets.** If deterrence fails, aerospace defense is designed to destroy attacking enemy aircraft, missiles, and space vehicles after they leave the earth's surface or to nullify or reduce the effectiveness of such attacks. **Aerospace defense consists of three mission areas** that must operate in union for maximum effectiveness: **air defense,** which is designed to destroy, nullify, or reduce the effectiveness of attacking enemy aircraft or missiles; **ballistic missile defense,** which defeats long-range ground- and sea-launched ballistic missiles; and **space defense,** which consists of all defensive measures designed to destroy, nullify, or reduce the effectiveness of attacking enemy vehicles while in space. No single mission area is capable of providing complete protection from a determined aerospace attack against North America and a combination of active and passive defense measures from all mission areas is required. The basic defense criteria — to detect, classify, track, intercept, and destroy — remain the same for all three mission areas. **Active aerospace defense measures** consist of direct defensive actions to destroy, nullify, or reduce the effectiveness of enemy air, ballistic missile, and space systems. **Passive aerospace defense measures** include nonlethal measures of deception, mobility and dispersion, the use of systems hardening and protective construction, and include integrated tactical warning and attack assessment functions.

Command, Control, Communications, Computers, and Intelligence Systems

Command, control, communications, computers, and intelligence (C4I) systems are integral parts of all three aerospace defense mission areas.

Effective command, control, communications, computers, and intelligence (C4I) systems are required to direct all aerospace defense efforts toward the principal objective of defending North America. These systems enable centralized planning to provide the direction for coordinated and mutually supporting employment of forces and assets as well as decentralized execution of the rapidly changing operations. C4I gives commanders the resources necessary to control forces, plan missions, and coordinate operations. **The North American Aerospace Defense Command (NORAD) is responsible for the aerospace defense** (which currently includes air sovereignty, integrated tactical warning and attack assessment, and air defense) **of North America** and is a binational command composed of Canadian and United States forces.

C4I systems should be flexible enough to allow redirection of certain forces, even when airborne.

Effective C4I systems for aerospace defense operations, including surface-, air-, and space-based assets, **should be capable of rapidly exchanging information as well as displaying information of common concern**. The information exchange between all levels of command should be redundant and flexible, even when an intermediate level has been disabled. **These systems include command centers, operations centers, processing centers and systems, data sources, and communications systems.** The principal assets that exist for aerospace defense operations include Cheyenne Mountain Operations Center, regional air operations centers, and sector air operations centers. **Intelligence is critical to the planning and execution of aerospace defense** and is a continuous process that provides vital information on enemy actions, capabilities, vulnerabilities, and intentions. A complete integration of intelligence throughout the NORAD command structure ensures responsiveness to operational needs.

Aerospace Defense Operations

Aerospace defense operations should be continuous and should not be conducted in isolation.

Aerospace defense will be a top priority mission as long as an enemy has the ability to threaten North America with air, missile, or space systems. Offensive operations will be conducted with aerospace defense operations to terminate any conflict as early as possible on terms favorable to North America.

Passive aerospace defense. **Passive aerospace defense enhances the survivability of people and assets by reducing the potential effects of enemy attacks.** Some of the primary passive measures include: mobility, maneuvering, and dispersal; system hardening and protective construction; reconstitution; nuclear, biological, and chemical defense equipment and facilities; redundancy; connectivity of timely alert, warning, and all-clear systems; camouflage, concealment, and deception; and security measures.

Active air defense. **Active air defense operations are primarily conducted using an assortment of weapon systems supported by secure and highly responsive C4I systems.** The active defense operations (interception, area defense, point defense, combat air patrol, and air escort) of active defense resources (aircraft; surface-to-air weapons; and surface, air, and space C4I systems) must be integrated and coordinated in order to defend North America.

Active ballistic missile defense. **Active ballistic missile defense will provide defense of North America and Hawaii** against limited ballistic missile attacks by destroying ballistic missiles during flight. Ideally, the preferred method of countering such a threat is to detect, identify, attack, and destroy it prior to launch and, if need be, intercept and destroy missiles once they are launched.

Active space defense. Active space defense represents those actions taken to negate enemy space systems in order to nullify or reduce the effectiveness of an attack against North America. **Space defense should focus on detecting, classifying, tracking, intercepting, and destroying enemy space forces and systems.**

Integration of active and passive defense. The successful execution of aerospace defense of North America requires an integrated structure of global warning and surveillance systems, engagement systems, and C4I systems. **All elements are highly interdependent and loss of any element may seriously degrade the overall aerospace defense capability.** The optimum employment of weapon systems requires early separation of friend and foe to maximize the engagement as far from North America as possible while avoiding fratricide.

Aerospace defense requires the use of surface, air, and space assets. The successful conduct of these operations requires the exploitation and integration of many support systems from different components. **To ensure success, aerospace defense should be supported with supplementary systems,**

measures, and operations including air-to-air refueling, surveillance and reconnaissance, and logistics and support agencies.

CONCLUSION

This publication provides the guidance necessary to plan, coordinate, and execute joint aerospace defense of North America. It provides the doctrinal basis for how joint forces approach the air defense, ballistic missile defense, and space defense operations that support the Commander in Chief, North American Aerospace Defense Command's aerospace defense plan for North America.

CHAPTER I
JOINT DOCTRINE FOR AEROSPACE DEFENSE OF NORTH AMERICA

"For it is not profusion of riches or excess of luxury that can influence our enemies to court or respect us. This can only be effected by fear of our arms."

Vegetius
De Re Militari, circa 4th century

1. General

An enduring national security objective is the survival of the United States as a free and independent nation with its fundamental values intact and its institutions and people secure. Geographically, North America lies beyond the military reach of most regional powers. However, **the proliferation of advanced weapons and technology may bring the continent within the lethal reach of emerging regional military powers**. These regional powers may be capable of conducting attacks against North America, which could include the use of weapons of mass destruction (WMD). **The survival and security of North America may depend on the effective execution of aerospace defense against WMD and an assortment of conventional weapons.**

2. Aerospace Defense Operations

Deterrence remains one of the fundamental objectives of the United States. **If deterrence fails, aerospace defense is designed to destroy or nullify attacking enemy aircraft and missiles, and also negate hostile space systems**. The principal objective of aerospace defense is the protection of North America, its people, and other valuable assets.

3. Aerospace Defense Missions

As shown in Figure I-1, aerospace defense consists of **three mission areas that must operate in unison for maximum effectiveness: air defense, ballistic missile defense, and space defense**.

a. **Air Defense.** Air defense consists of **all defensive measures designed to destroy, nullify or reduce the effectiveness of attacking enemy aircraft or missiles.** Missiles may include ground-, air-, or sea-launched cruise missiles; and ballistic missiles with range capability less than 3500 kilometers. These operations may also include destruction of airborne missile launch platforms. Air defense includes both active and passive measures.

b. **Ballistic Missile Defense (BMD).** BMD exists to **defeat long-range ground- and sea-launched intercontinental ballistic missiles attacking North America.** These missiles are those with a range capability greater than 3500 kilometers. BMD operations include all active and passive measures designed to detect, classify, track, intercept, and destroy attacking ballistic missiles, or nullify or reduce the effectiveness of such attacks.

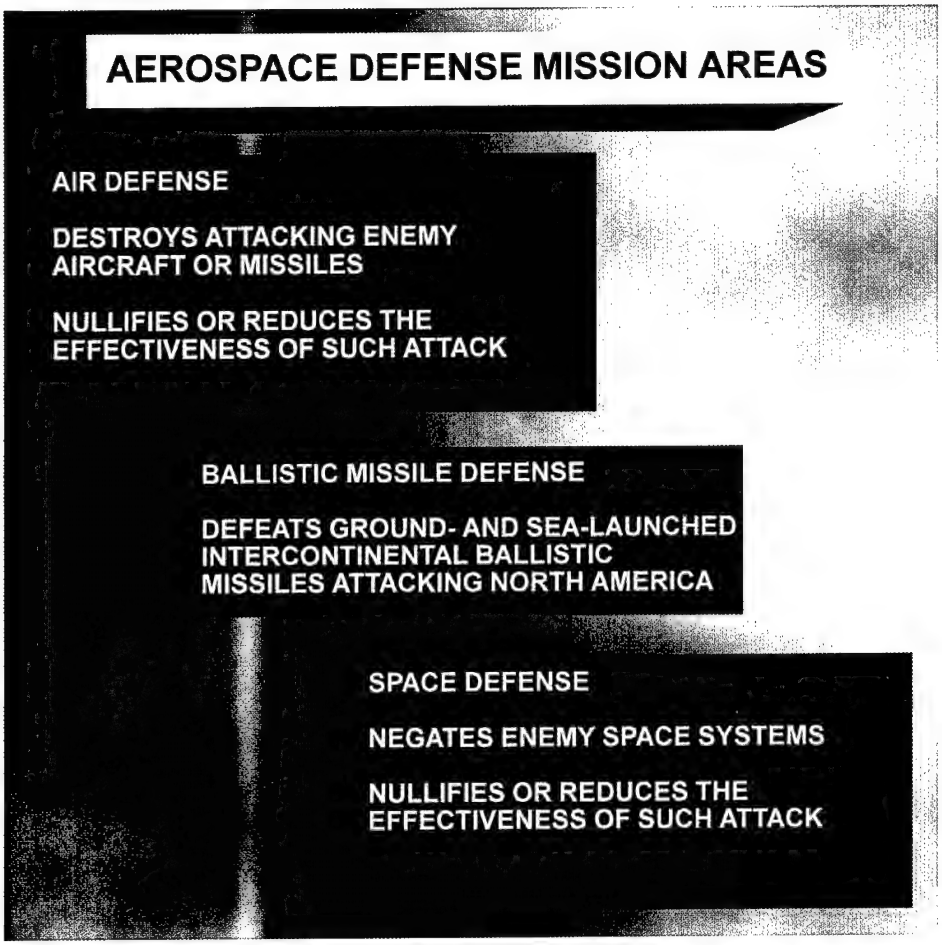


Figure I-1. Aerospace Defense Mission Areas

c. **Space Defense.** Space defense operations consist of **all defensive measures designed to negate enemy space systems**. Space defense operations include both active and passive measures. Within the contents of this publication, space defense relates to space attacks directed against North America.

4. Defense Measures

No single mission area is capable of providing complete protection from a determined aerospace attack against North America. **A combination of active and passive defense measures from all mission areas, integrated and coordinated by a robust and efficient command, control, communications, computers, and intelligence (C4I) system, is required to meet the stringent performance requirements demanded for aerospace defense of North America.** The basic defense criteria — to detect, classify, track, intercept, and destroy — remain the same for all three mission areas. Requirements to maintain continuous intelligence, global surveillance and reconnaissance capabilities, air sovereignty, and readiness training operations ensure control of North America's borders. Aerospace defense implies a reactive

THE FIRST AIR DEFENSE OPERATION

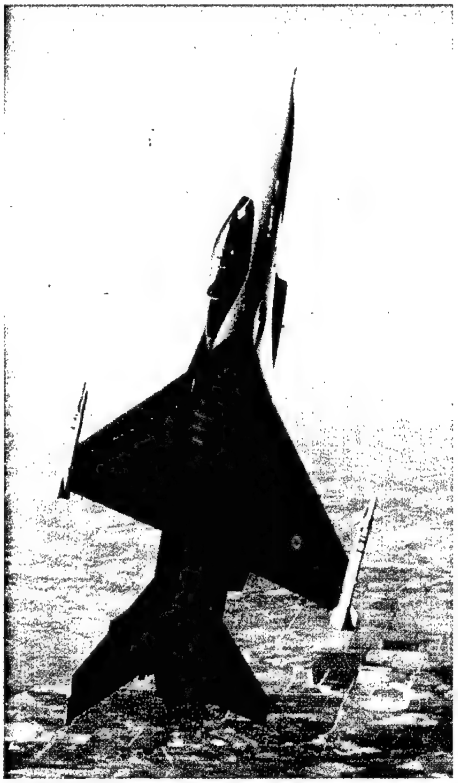
The history of air defense begins with the use of manned flight for military purposes. On June 5, 1783, the Montgolfier brothers, Jacques Etienne and Joseph-Michel, demonstrated the first public ascension of the hot-air balloon "L'Entreprenant." In April 1794 the French Army formed a balloon company. The next month it began reconnaissance operations over Austrian lines. General Jean Baptiste Jourdan, who had approved the formation of the balloon company, was impressed with information he received concerning enemy movements. Austrians, confused by this new element in warfare, took defensive action on June 13, 1794. They used two seventeen-pound howitzers to fire at the balloons. Although their shooting was ineffective, the Austrian opened the first chapter in the history of air defense.

SOURCE: Schaffel, Kenneth, The Emerging Shield, Office of Air Force History, 1991

posture that allows the enemy to choose the time and place of attack. However, aerospace defense operations should be conducted as far from North America as possible. The situation determines when, where, how, and which aerospace defense missions are executed.

a. **Active Aerospace Defense Measures.** Active aerospace defense measures are **direct defensive actions taken to destroy, nullify, or reduce the effectiveness of hostile air, ballistic missile, and space systems.** They include integrated tactical warning and attack assessment (ITW/AA) warning reports, and also such measures as the use of air, surface, and space-based systems to counter these attacking threats.

b. **Passive Aerospace Defense Measures.** Passive aerospace defense measures **include all measures other than active aerospace defense taken to minimize the effectiveness of hostile air, ballistic missile, and space systems.** These include but are not limited to such nonlethal measures as deception, mobility and dispersion, ITW/AA functions, and the use of systems hardening and protective construction.



Active aerospace defense measures include the use of air systems to counter attacking threats.

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CHAPTER II
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE SYSTEMS

"A failure of C4I in combat may result in overall mission failure; mission failure is totally unacceptable!"

MAJ GEN Albert J. Edmonds, USAF

1. General

Effective C4I systems are required to direct all aerospace defense efforts toward the principal objective of defending North America. **C4I systems are integral parts of all three aerospace defense mission areas.** These systems enable centralized planning and decentralized execution of operations. With centralized planning, the supported commander for aerospace defense of North America provides the direction for coordinated and mutually supporting employment of forces and assets. Supporting and subordinate commanders, with decentralized execution, provide direction that is responsive to a rapidly changing threat environment. C4I systems should continuously store, process, exchange, display, and forward aerospace defense situation data to regional ground, naval, and airborne command and control centers as well as to appropriate weapon systems. **Aerospace defense C4I should be robust and comply with Global Command and Control System standards to ensure interoperability with and among component forces and also with US combatant commands.** They give commanders the resources necessary to control forces, plan missions, and coordinate operations.

2. Command Relationships

The North American Aerospace Defense Command (NORAD) is responsible for aerospace defense of North America. The NORAD Agreement assigns NORAD the missions of aerospace warning for North America (currently includes the monitoring of manmade objects in space and the detection, validation, and warning of attack against North America, whether by aircraft, missiles, or space vehicles, utilizing mutual support arrangements with other commands) and aerospace control for North America (currently includes day-to-day surveillance and control of the aerial approaches to North America in order to safeguard the sovereign airspace of both countries and, in times of crisis or war, air defense against manned or unmanned air-breathing vehicles approaching North America). NORAD is a binational command composed of Canadian and US forces. The Commander in Chief, North American Aerospace Defense Command (CINCNORAD), and staff fall outside the authority of unilateral Department of Defense action. Matters dealing with NORAD are binationally approved by either the Canada-US Permanent Joint Board on Defense or the Canada-US Military Cooperation Committee. US Element NORAD provides the mechanism through which US forces are allocated to NORAD. **The Commander, US Element NORAD (CDRUSELEMNORAD), is authorized combatant command (command authority) by the President through the Unified Command Plan.** Detailed discussions on command relationships are found in Joint Pub 0-2, "Unified Action Armed Forces (UNAAF)," the NORAD Agreement, and NORAD Terms of Reference. The following commands, responsibilities, and authorities of various commanders exist for the conduct of binational aerospace defense operations.

a. **Combatant Command (Command Authority) (COCOM).** COCOM is the nontransferable command authority established by title 10, United States Code, section 164, exercised only by commanders of unified or specified combatant commands unless otherwise directed by the President or the Secretary of Defense. **Normally, CINCNORAD exercises operational control over Canadian and US forces assigned, attached, and made available to NORAD.**

b. **Operational Control (OPCON). OPCON for the binational employment of Canadian and US forces is defined as the authority to direct, coordinate, and control the operational activities of assigned and attached forces, and over those forces that are made available.** No permanent changes of station will be made without approval of the higher national authority concerned. Temporary reinforcement from one area to another (including the crossing of the international boundary) to meet operational requirements will be made within the authority of commanders having operational control. OPCON may be delegated to and exercised by commanders at any level when appropriate. **CINCNORAD may direct rapid changes in the OPCON of aerospace defense forces to meet new threats should the situation dictate.**

c. **Tactical Control (TACON). Rapid changes of TACON may also be required to meet evolving threats and situations.** Subordinate commanders must be prepared to transfer TACON between regions even during the terminal phases of engagement. Unit commanders should assume TACON and operate autonomously, consistent with approved rules of engagement (ROE), if command and control (C2) elements and systems are destroyed or rendered inoperable.

d. **CINCNORAD.** The Canadian and US Governments approve the appointment of CINCNORAD. CINCNORAD is responsible to the Canadian government and the National Command Authorities (NCA) of the United States. CINCNORAD and Deputy CINCNORAD will not be from the same country. CINCNORAD is normally a US commander who is also Commander in Chief, US Space Command (USCINCSPACE) and CDRUSELEMNORAD. If CINCNORAD is a Canadian, USCINCSPACE remains CDRUSELEMNORAD and is also designated Deputy CINCNORAD. **CINCNORAD assigns tasks, designates objectives, and issues directives concerning NORAD operational matters to regional and subordinate NORAD commanders.** CINCNORAD also develops and submits plans for approval to the Chief of the Defense Staff of Canada and the Chairman of the Joint Chiefs of Staff of the United States for the deployment and operational use of all forces, weapons, and equipment assigned, attached, and made available, including augmentation forces.

e. **Commander, US Element, North American Aerospace Defense Command. CDRUSELEMNORAD, the senior US officer assigned to NORAD, exercises COCOM over the forces assigned by the Secretary of Defense.** If directed by the Secretary of Defense, CDRUSELEMNORAD may employ or reallocate US NORAD forces to another combatant commander for unilateral US action.

f. **Commander in Chief, US Space Command. USCINCSPACE responsibilities include:**

- Supporting NORAD by providing the missile warning and space surveillance necessary to fulfill the US commitment to the NORAD agreement.

- Exercising COCOM over those assigned US forces that provide warning of missile attack on the continental United

States (CONUS) and Alaska and warning and assessment of space attack.

- Conducting space operations by exercising COCOM over assigned space defense, space support, and force enhancement forces, as well as forces that provide strategic ballistic missile defense for the United States.

- Providing integrated tactical warning and attack assessment of space, missile, and air attacks on CONUS and Alaska should NORAD be unable to accomplish the assessment mission.

g. **US Combatant Commanders.** Support relationships between CINCNORAD and US combatant commanders are in accordance with Joint Pub 0-2, "Unified Action Armed Forces (UNAAF)." **Combatant commanders may be tasked by higher authority to conduct offensive operations in their respective areas of responsibility to support the aerospace defense of North America.**

h. **NORAD Regional Commanders.** Three NORAD regional commanders are responsible to CINCNORAD: Commander, Continental NORAD Region; Commander, Canadian NORAD Region; and Commander, Alaskan NORAD Region. **They are responsible to CINCNORAD for all air defense activities in their respective regions.** These regional commanders are the principal advisors to CINCNORAD. They coordinate on matters of mutual interest and refer matters of disagreement to CINCNORAD for resolution. Each region's organization is based on specific geographic responsibilities.

i. **NORAD Sector Commanders.** NORAD sector commanders, where established, are responsible to regional commanders for assigned missions. They provide atmospheric warning to the regional commanders and to CINCNORAD, as well as respond to air attacks in accordance with CINCNORAD tasking.

3. C4I Requirements and Resources

Effective C4I systems for aerospace defense operations — including surface-, air-, and space-based assets — should be capable of rapidly exchanging information as well as displaying information of common concern. The information flow and direction should follow the NORAD chain of command and be as robust, survivable, interoperable, secure, and near-real-time as possible. **C4I systems should be flexible enough to allow redirection of certain forces, even when airborne.** The information exchange between all levels of command should be redundant and flexible, even when an intermediate level has been disabled. These systems include command centers, operations centers, processing centers and systems, data sources, and communications systems. The following resources, also shown in Figure II-1, are the principal assets that exist for aerospace defense operations.

a. **Cheyenne Mountain Operations Center (CMOC). CMOC is the primary fixed ITW/AA system correlation node.** It allows ITW/AA information to be forwarded to the Canadian National Defense Operations Center (NDOC), the US National Military Command Center (NMCC), NORAD, appropriate commands, and other users. When necessary, the NDOC and NMCC will pass this information to their respective governments.

b. **NORAD/USSPACECOM Command Center.** The NORAD/USSPACECOM Command Center, located in CMOC, **provides CINCNORAD with a consolidated command and control location to evaluate data from all sources and make an assessment of the situation to determine whether or not North America is under attack.** The NORAD/USSPACECOM Command Center directs all NORAD systems and forces in the conduct of real-time operations for

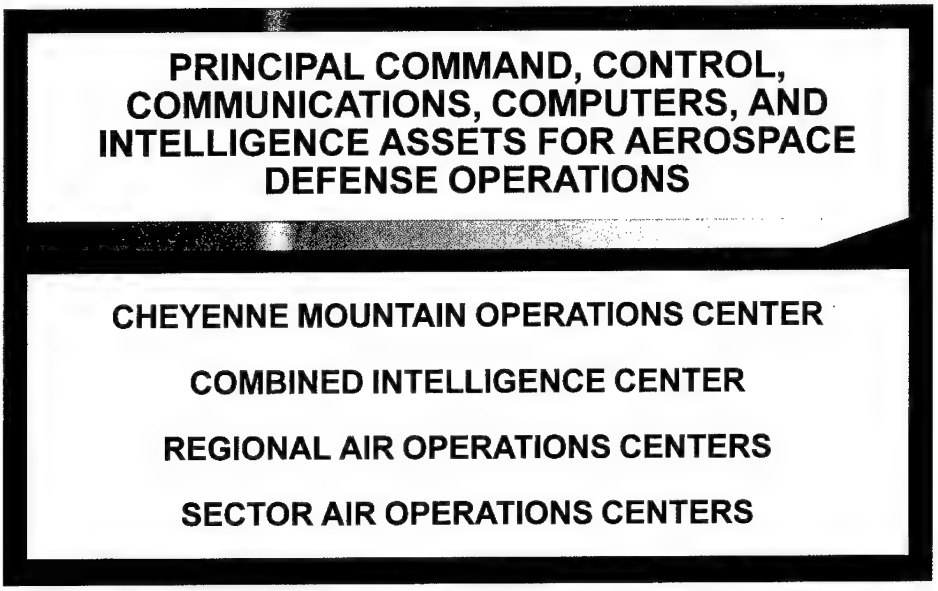

Figure II-1. Principal Command, Control, Communications, Computers, and Intelligence Assets for Aerospace Defense Operations

CINCNORAD. The NORAD/USSPACECOM Command Center monitors all sources of space surveillance, missile warning, and atmospheric defense activities.

c. **Missile Warning Center.** Also located in CMOC, **the Missile Warning Center manages all ballistic missile tactical warning and attack assessment, detection, and reporting systems.** Through the use of data derived from component commands, the Missile Warning Center ensures that timely, accurate, and unambiguous warning of a missile attack against North America is relayed to the NORAD/USSPACECOM Command Center.

d. **Air Defense Operations Center.** The Air Defense Operations Center, located in CMOC, **collects threat and fighter generation status information from the regional operations control centers and provides that information to the NORAD/USSPACECOM Command Center for threat evaluation and assessment by CINCNORAD.** The threat assessment is passed to the Canadian government and the NCA of the United States.

e. **Regional Air Operations Centers (RAOCs).** NORAD has three RAOCs: CONUS, Canadian, and Alaskan. **RAOCs are the primary command, control, communications, and computers (C4) facilities used by regional commanders to exercise OPCON over assigned forces.** RAOCs allow surveillance, identification, and control of aircraft within or near their regions.

f. **Sector Air Operations Centers (SAOCs).** SAOCs are responsible to their respective RAOCs and are the C4 facilities used by sector commanders to exercise OPCON over assigned forces. **SAOCs have the capability to receive, process, and display radar inputs that provide aircraft location information.** The SAOCs permit the surveillance and identification of air-breathing threats and control of aircraft.

g. **Combined Intelligence Center (CIC).** The CIC plays vital roles in the following:

- The missions of CINCNORAD and USCINCSPACE, including warning, air defense, ballistic missile defense, ballistic missile analysis, support to the Single Integrated Operation Plan, and treaty monitoring and space operations and operations require timely collection, analysis, production, and dissemination of reliable and accurate intelligence information. Continuous information from sensors and sources is needed to provide timely detection and warning, to reliably identify and assess enemy capabilities and intentions, and to allow a layered defense to nullify hostile actions. **Near-real-time intelligence data enhances the accurate employment of aerospace defense forces.** The NORAD/ USSPACECOM CMOC is the centralized receiver of intelligence information and the single disseminator of all-source air and space intelligence for NORAD and its subordinate commands as required by the US DOD Intelligence Production Program. The dissemination of relevant intelligence among US and Canadian forces, in accordance with established policies and procedures, is crucial to effective aerospace defense missions. This integration of intelligence throughout the NORAD command structure ensures responsiveness to operational needs.

Current and accurate intelligence is needed in order to provide effective responsiveness.

- The missions of the Intelligence Community and other DOD agencies. The CIC is also the primary center within the Department of Defense for analysis of foreign space operations.

4. Intelligence Support and Requirements

Intelligence is critical to the planning and execution of aerospace defense. **Effective intelligence support begins during peacetime.** It is a continuous process that provides vital information on enemy actions, capabilities, vulnerabilities, and intentions. The survivability of North America and the effective conduct of aerospace defense

THE EMERGING SHIELD - GROWING PAINS IN THE 1950s

In 1954 the administration of President Dwight D. Eisenhower supported the development of a large and sophisticated continental air defense buildup. Air defense would undergo a technological transformation to match in importance the development of radar in the late 1930s. However, the automated systems that would eventually revolutionize air defense operations were still being perfected in research laboratories in the early 1950s. For the forces on alert in the field, computerized systems remained years away. Field forces had to make the best use of equipment at hand, regardless how inadequate, and hope to meet the threat if called upon. An incident during the spring of 1952 highlighted the problems of the defenses.

On April 16, 1952, Col. Woodbury M. Burgess, General Chidlaw's intelligence chief at Air Defense Command, received a "troublesome" piece of information from Headquarters USAF. The information, categorized as an "indication," implied that it came from a clandestine source and concerned Soviet military movements. Burgess and his intelligence staff remained in the ADC Combat Operations Center, but by late in the evening they had received no further information to confirm the warning, so Burgess decided they could go home. Meanwhile, he informed Maj. Gen. Kenneth P. Bergquist, ADC operations deputy, of the special intelligence, and the two decided there was no reason at that time to inform either General Frederic H. Smith, ADC Vice Commander, or General Benjamin W. Chidlaw, ADC Commander, of the incident.

Shortly after midnight, the Western Air Defense Force operations center on Hamilton Air Force Base, California, notified Colorado Springs of four vapor trails sighted an hour and twenty-seven minutes earlier over Nunivak Island in the Bering Sea, heading east by southeast. The information originated at the Elmendorf, Alaska, center and was transmitted through McChord Air Force Base, Washington, which provided the only communications links between the two systems. A captain on duty in the intelligence section on Ent Air Force Base, Colorado received the news and promptly phoned Colonel Burgess, who hurriedly returned to the Combat Operations Center. Once there, he directed that the Royal Canadian Air Force be informed of the sighting; he also notified General Bergquist, who rushed back to the center. Bergquist also attempted to confirm the sighting with the Alaskan center, but before the call could be completed, the line between McChord and Elmendorf went dead, leaving all involved "simply exasperated." Bergquist now phoned General Smith, saying "We have something hot—I think you better come over."

Smith arrived in the Operations Center and had no sooner begun considering the various options when the decision was, in effect, made for him. At 0310 the intelligence duty officer came running to Smith with word that "Eastern [Air Defense Force] has just called in and reported five 'unknowns' coming in over Presque Island [Maine]." One minute later Smith ordered ADC on full Air Defense Readiness alert. At the same time, notification went out to the air defense region commanders, to the Strategic Air Command, and to the USAF Command Post in the Pentagon over hot lines specially installed for such emergency situations. Meanwhile, commanders of TAC, Air Research and Development Command, Air Proving Ground, and Air Training Command, all pledged to commit radar and fighter units in an emergency, were contacted

by commercial toll calls. Also within fifteen minutes, telephone and teletype lines throughout the aircraft control and warning network were operating, an accomplishment described as "A miracle of dead-of-night efficiency." On fighter bases, the number of aircraft in immediate readiness increased from 88 to 240 within the first hour.

. . . General Chidlaw canceled the operation at 0550. Communications had not been reestablished with Elmendorf, nor had the mysterious contrails over Nunivak been identified. In the east, sightings were narrowed to three "unknowns," which interceptors identified as friendly. These were French, British, and Pan American airliners that had drifted from their scheduled courses on flight plans other than those reported to the Presque Isle site. No one blamed the pilots; they had reported their changes in-flight to Canadian flight-monitor stations. Communications between the stations and ADC's Presque Isle radar site had failed, and the course changes were not identified in the Eastern Air Defense Force's identification logs.

Later, when the incident could be seen in greater perspective, General Chidlaw concluded that the alert had made "more of our top Air Force people . . . aware of the very thin margin of evidence on which we too frequently must base our decisions." If that thin margin was to be overcome, the nation would have to make a substantial investment in sophisticated technology applicable to air defense systems. Meanwhile, the debate over how much to invest in air defense went on during the Korean War period, not only in Air Force councils but also in specially formed, civilian-led committees and among influential scientists and journalists. Their assessments would be crucial in deciding the future of continental air defense.

SOURCE: Schaffel, Kenneth, The Emerging Shield, Office of Air Force History, 1991

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CHAPTER III
AEROSPACE DEFENSE OPERATIONS FOR NORTH AMERICA

"We can sleep tonight. The Guards are in front of us."

Gerald Kersh
They Die with their Boots Clean, 1941

1. General

Aerospace defense will be a top priority mission as long as a potential enemy has the ability to threaten North America with air, missile, or space weapons. Aerospace defense operations should be continuous and should not be conducted in isolation. If the survival of North America is threatened, all instruments of national power will be used to counter the threat. **Offensive operations will be conducted concurrently with aerospace defense operations to terminate any conflict as early as possible on terms favorable to North America.** Appropriate US commanders of combatant commands (CINCs) conduct these offensive operations as directed by the NCA.

a. **Offensive Operations. Strategic and theater forces normally conduct offensive operations under the command of appropriate CINCs.** They should be conducted at the time and place of our choosing to destroy hostile targets as close to their source as possible. These operations are directed against enemy weapon systems, weapon launchers, and any support infrastructure that may contribute to the enemy's air, missile, and space capability to attack North America. **Offensive operations destroy, disrupt or limit enemy air, missile, and space power prior to launch or intercept them while transiting the CINC's area of responsibility.** Attempts are made to destroy the enemy's ability to launch initial strikes or to re-arm and reconstitute forces for follow-on attacks. The main goal is to prevent the launch and employment of enemy air, missile, and space threats. Otherwise, these threats will be sought and attacked wherever found. Destruction of these threats prevents their employment against critical assets in North America.

b. **USCINCSPACE. USCINCSPACE supports offensive operations by providing surveillance and warning to the appropriate CINCs.** This tactical warning allows offensive forces the time for posturing and execution options. All-source, fused intelligence provides vital information on the order of battle, capabilities, intentions, and actions of the enemy. An intelligence assessment of enemy threats, locations, and capabilities helps determine offensive target selection, target priority, and the order in which targets are attacked. The vulnerability of each target is determined by evaluating its active and passive defenses. Targets may be planned prior to hostilities and kept current based on the latest intelligence.

c. **Airspace Control. Airspace control of North America may become very complex and saturated during wartime.** The timely exchange of information over reliable, interoperable means of communication is needed to effectively coordinate, integrate, and deconflict the airspace used for military and civilian air operations. **CINCNORAD will coordinate with the Canadian government and US national authorities in the preparation of plans for airspace surveillance and control** to ensure the development of complementary national systems capable of being operated as integral parts of the NORAD structure. CINCNORAD also coordinates with

appropriate Canadian and US national authorities in the development of policy and broad plans for the security control of air traffic, the control of electromagnetic radiations, and the control of illumination and, where appropriate, initiation of implementing actions. These plans are also closely tied to plans for the security of friendly civilian air traffic. These plans provide specific airspace control procedures applicable for defined locations and periods of time. CINCNORAD establishes the geographic regional boundaries in which airspace control is to be exercised, and provides priorities and restrictions regarding the use of the airspace. **The main goals are standardized procedures, close coordination to deconflict all airspace users, enhancement of aerospace defense operations, and protection from enemy attacks.** The C4I structure should be designed to integrate with national and binational components in order to be responsive and timely.

d. **Friendly or Enemy Identification.** Airspace control is a combination of positive and procedural control intended to effectively provide safe and flexible use of airspace. **Accurate and timely identification is needed to ensure engagement of enemy threats, conservation of resources, and reduction in risk to friendly forces.** Positive control relies on positive identification, tracking, and directing of aircraft conducted with electronic means by an authorized RAOC or SAOC. Procedural control relies on a combination of airspace control measures which have been previously agreed on and promulgated. Necessary exchange of information between the air traffic control facilities and the airspace users requires reliable voice and data nets, radar, and active and passive identification means. Normally, electronic methods provide the most rapid and reliable means of identification and should be used when available.

e. **Coordination and Integration of Airspace Control and Aerospace Defense. Unity of command is imperative to effectively employ all aerospace defense forces.** CINCNORAD coordinates and integrates airspace control and aerospace defense operations, enhances the effort to control the airspace over North America, and protects people and other valuable assets. The forces committed to aerospace defense are composed of assigned and attached forces and resources under the command and control of Canada and the United States. **Aerospace defense, air traffic control, and intelligence operations should be integrated and managed by agencies of Canadian and US Governments.** Accordingly, each element of the aerospace defense system should be organized in a manner that enhances close coordination with the operational activities of those agencies. Such planning is especially critical when autonomous operations are required. Airspace surveillance and control are expected to continue as functions important to the sovereign control of national airspace. Each government should maintain a system to carry out these activities in conjunction with the air defense and aerospace surveillance and warning operations of NORAD. Airspace surveillance and control systems should be integrated, compatible, and capable of a high degree of coordination.

2. Passive Aerospace Defense

Passive aerospace defense measures apply to each aerospace defense mission area: air defense, ballistic missile defense, and space defense. As shown in Figure III-1, **they include all measures (other than active aerospace defense measures) taken to minimize the effectiveness of hostile air, missile, or space systems.** Passive measures do not involve the employment of any lethal weapons, but they enhance survivability of people and assets by reducing the potential

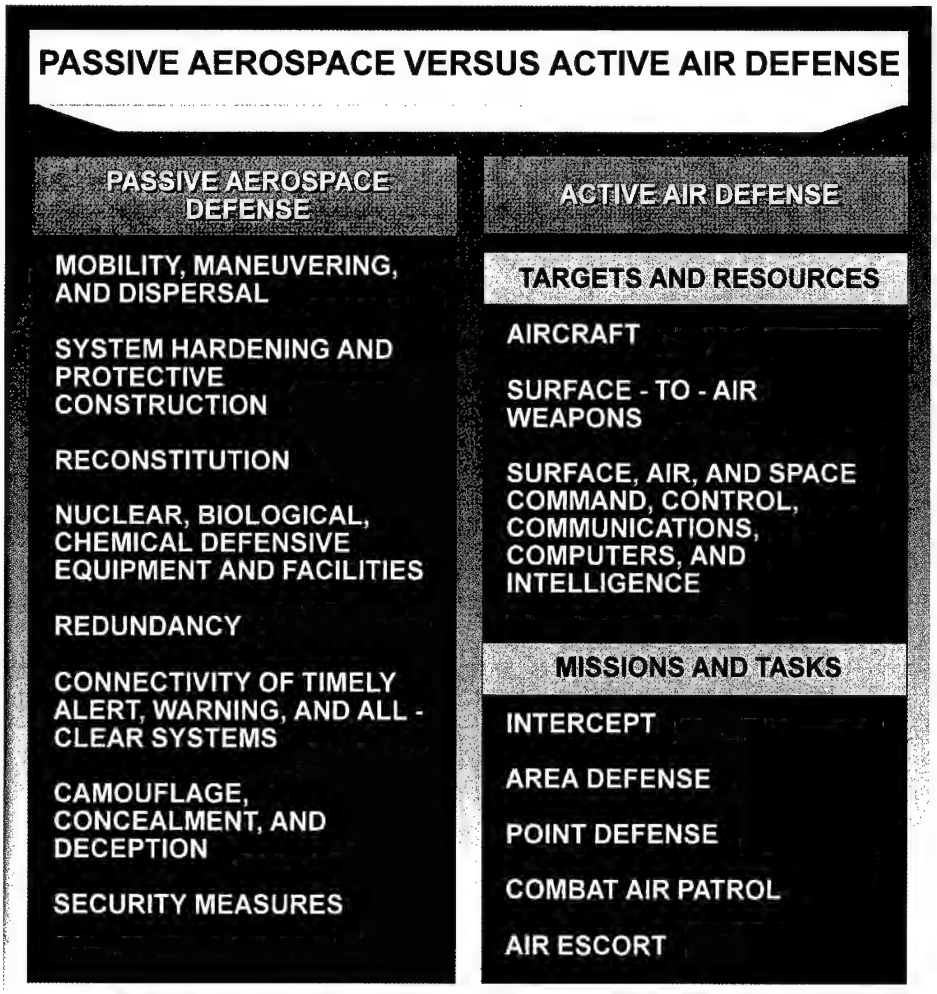


Figure III-1. Passive Aerospace Versus Active Air Defense

effects of enemy attacks. They are a defense against those threats that escape active defense measures. The effectiveness of passive measures may be increased through peacetime planning, exercising, training, reliable communications, and operations security practices. All levels of government, military, and civilian authorities should coordinate and be responsible for the execution of passive measures. CINCNORAD, in coordination with appropriate commanders, will develop and implement plans and establish procedures for early warning of aerospace attack. **With the approval of the Canadian Government and the US NCA, CINCNORAD determines and announces defense readiness conditions (DEFCONs).** CINCNORAD also establishes procedures for advising the US and Canadian Governments, military commands, and the appropriate Canadian and US civil defense authorities regarding DEFCONs. Strategic warning will trigger some passive defense measures. Warnings are both general (attacks are imminent or underway) and specific (certain units or areas of North America appear to be targeted). Depending on the situation and time available, a variety of measures can be taken to improve the passive defense posture of North America. Some of the primary passive measures are discussed below.

a. **Mobility, Maneuvering, and Dispersal.** Mobility, maneuvering, and dispersal complicate the enemy's ability to locate and target friendly assets. **These measures are accomplished by moving assets out of a target area before an attack occurs, spreading them out, and then bringing them together at the time and place of our choosing.** This makes certain targets less lucrative and requires the enemy to expend more resources and time locating valid targets. Initiation of these measures may require strategic and tactical warning.

b. **System Hardening and Protective Construction. Valuable assets and their shelters are hardened to protect against hostile attacks and also provide protection against the effects of electromagnetic pulse and transient radiation on electronics.** Accordingly, hardening requirements should be considered when developing design specifications for critical system upgrades or for new systems. These measures should be accomplished or begun in peacetime.

Mobility, maneuvering and dispersal are passive measures of defense.

c. **Reconstitution.** This capability provides for the **rapid repair of damages resulting from enemy attacks and returning damaged units to a desired level of readiness.** Reconstitution consists of the reorganization or regeneration of people and equipment to restore combat capability. This includes the ability to repair valuable assets such as airfields, communications and warning and surveillance systems, as well as to restore essential services such as power, water, and fuel supplies.

d. **Nuclear, Biological, and Chemical (NBC) Defensive Equipment and Facilities.** NBC defensive equipment and facilities **provide detection, identification, protection, and decontamination from weapons of mass destruction.** Use of individual protective equipment (including full body ensembles for friendly forces) permits continuation of vital functions and missions in an NBC environment.

e. **Redundancy.** This concept allows vital systems and capabilities to continue operations even when certain nodes are destroyed or damaged. **Redundancy includes dual, contingency, or backup capabilities** that can assume primary mission functions, in whole or in part, upon the failure, degradation, or destruction of the primary system.

f. **Connectivity of Timely Alert, Warning, and All-Clear Systems.** Connectivity of available communications and sensor systems is required for transmitting accurate, real-time data to friendly forces. These systems provide maximum reaction time for friendly forces to seek shelter or take appropriate action against enemy attacks.

g. **Camouflage, Concealment, and Deception (CCD).** CCD **denies accurate location and targeting of friendly assets by misleading and feeding false information to the enemy.** It reduces vulnerability of friendly assets by limiting their exposure to targeting. CCD is conducted over the long term or in response to warning. CCD operations, routinely conducted, may deny an enemy vital data about friendly forces.

h. **Security Measures.** Security measures include **programs designed to protect information from corruption, destruction, or exploitation.** Operations security (OPSEC) and information security make up the two basic elements of security measures. **OPSEC** is the process of identifying critical information and subsequently analyzing friendly actions to preclude observation by adversary intelligence systems. This includes determining indicators that may provide vital information to an enemy. Effective OPSEC depends on executing measures that eliminate or reduce to an acceptable level the vulnerabilities of friendly actions to adversary exploitation. Alerting of forces to periods of adversarial intelligence collection, to include satellite reconnaissance advanced notice, is one key aspect of successful OPSEC activities. **Information security** relates to the technical protection of information by communications and computer security programs.

3. Active Air Defense Operations

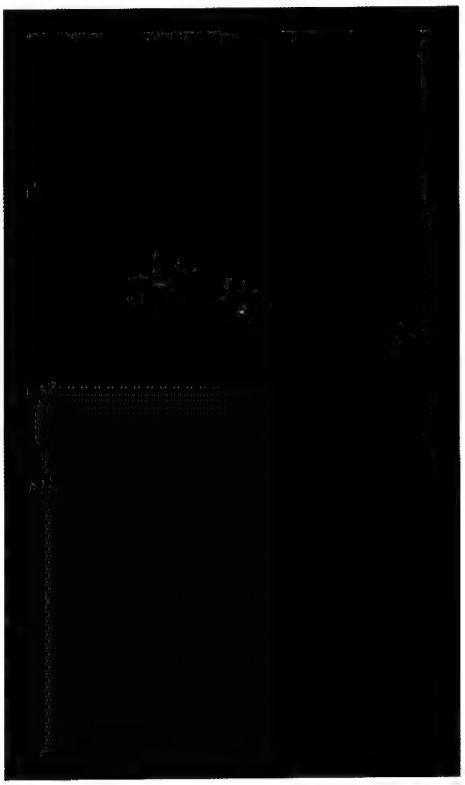
Few nations are capable of threatening North America through sustained air and missile attacks. However, past wars, conflicts, and other military operations have demonstrated that some regional military powers may be willing to threaten and attack the United States, even though military victory may seem impossible. In such cases, enemy objectives may be more political and economic than military. Air defense forces should counter these attacks and deny the enemy the ability to attain their objectives. **Active air defense is direct defensive action taken to nullify or reduce the effectiveness of hostile air action against North America.** These operations are primarily conducted using an assortment of weapon systems supported by secure and highly responsive C4I systems. Integrated employment of these systems, through coordinated detection, identification, tracking, warning, assessment, and engagement of enemy forces, is essential to blunt enemy attacks and protect friendly forces and other vital assets. **Implementation of positive control or procedural measures should ensure that friendly aircraft can safely transit friendly airspace without inhibiting air defense or other friendly air operations.** Electronic, visual, or procedural measures are used by air defense forces to readily identify air threats in the airspace. Rapid, reliable, and secure means of identification are critical to the survival of friendly aircraft and to the effectiveness of air defense.

a. **Active Air Defense Targets and Resources.** Active air defense is very dynamic and reactive to enemy actions. Specific targets are not easily identified prior to hostilities. When conducting active air defense missions, **the primary enemy targets include aircraft and missiles (sea, land, and air launched). Normally, aircraft and surface-to-air missiles provide the preponderance of force used to counter enemy targets.** Integration of these systems allows efficient control and exchange of essential real-time information. All Services and binational forces should work in unison

and provide a mix of dedicated air defense weapon systems to maximize effectiveness. A multi-layered defense may balance the limitations of some assets with the advantages of others. C4I systems and capabilities are needed for forces planning, situation assessment, posturing, and executing aerospace defense operations. These include early warning and surveillance, command and control, sensors and satellites, radars, identification, and dissemination systems. Refer to Joint Pub 3-01.5, "Doctrine for Joint Theater Missile Defense," for detailed information on the unique characteristics of cruise missiles, short-range ballistic missiles, and other theater missiles, as well as defensive measures used to counter them.

b. **Active Air Defense Missions and Tasks.** Depending on the type of enemy system attacking North America, **active air defense missions will be executed to achieve specific aerospace defense objectives.** Tasked units should have decentralized execution authority and be given latitude in the detailed planning and coordination of assigned missions. The right to self-defense is inherent in all mission areas and is normally governed by common sense and published ROE. It allows friendly units to defend themselves against direct attack or threat of attack through the use of organic weapons and electronic warfare. The following missions are directly connected to active air defense operations:

- **Intercept.** Intercept missions may involve the use of aircraft from ground alert status, combat air patrols, or redirection from other missions. **Ground- or air-controlled intercepts will be conducted under close control, broadcast control, or current tactical control procedures.** In the event that no form of control is available, aircrews should be prepared to operate autonomously.



Because aircraft serve as one of the main defense forces against attack, they are often a primary enemy target.

- **Area Defense.** Area defense missions **are conducted for the defense of a broad area of North America.** Specialized applications of area defense may be used when friendly assets are spread over a large geographic area.
- **Point Defense.** Point defense missions are **conducted for the protection of a limited area.** Normally, they involve defense of the critical elements of a force or vital installation such as a command and control facility, port, or air base.
- **Combat Air Patrol.** Combat air patrol missions enable rapid reaction to enemy intrusion and may be positioned well forward of areas to be defended. **Patrols may also be conducted over a specific**

area, over critical areas of North America, or over land, air, and sea corridors. These flights contribute directly to active air defense operations when they intercept and destroy attacking enemy aircraft and missiles before they threaten North America.

- **Air Escort.** Air escort missions may be **flown to support and to protect such high-value assets** as air-to-air refueling, C2, and electronic warfare aircraft from enemy air and missile threats.

4. Active Ballistic Missile Defense Operations

Long-range ballistic missiles constitute the principal aerospace threat to North America. Active BMD may only provide a limited defense of North America against ballistic missile attacks by destroying or nullifying ballistic missiles during flight. Ideally, **the preferred method of countering such a threat is to detect, identify, attack, and destroy it prior to launch.** However, BMD forces are reactive in nature. CINCs, if tasked by the NCA, execute appropriate offensive operations to destroy long-range ballistic missiles, missile launch platforms, and supporting infrastructure prior to missile launch. **Active BMD forces should be able to detect, classify, track, intercept, and destroy attacking ballistic missiles.** Active BMD should also have the means for near-real-time kill assessment and rapid damage assessment to determine the need for subsequent engagements.

a. **Active BMD Targets. Active BMD targets may include long-range ballistic missiles possessing nuclear, biological, or chemical capabilities.** These missiles pose several unique problems to BMD forces: extremely high velocities; short time of flight (30-40 minutes); and missile masking by debris, multiple warheads, atmospheric effects, and penetration aids. These factors, coupled with compressed reaction time for attack assessment and for selecting the appropriate response, require highly automated systems to support decision makers. Accordingly, computers should be used to generate display options to make targeting decisions more manageable. Additionally, automated battle management should be used to assist in characterizing the attack. This should provide launch location, predicted impact point and time, proposed defensive responses, and feedback on negating attack forces to adjust responses. The human-in-the-loop is required to command and control the automated battle manager. The CINC decides when to activate BMD forces and how to respond with the appropriate force.

b. **Active BMD Resources.** Planning for active BMD begins during peacetime and focuses primarily on those nations or rogue elements possessing ballistic missile capabilities or actively seeking to develop or purchase such capabilities. **Under the 1972 Anti-Ballistic Missile (ABM) Treaty, the United States is limited to a single, ground-based, antiballistic missile site.** In such a case, fixed-based ABMs would primarily be used to destroy incoming ballistic missiles during their late midcourse or terminal phase of trajectory. Midcourse and terminal phase intercepts may reduce warhead effects and collateral damage; however, damage may still occur from debris falling on the defended area. **No operational capability exists to conduct active BMD and defend North America from long-range ballistic missile attacks.**

5. Active Space Defense Operations

Active space defense represents those actions taken to negate enemy space systems to nullify or reduce the effectiveness of an attack against North America. **Space defense should focus on detecting, identifying, tracking, and negating enemy**

space systems supporting attacks on the continent of North America. No operational capability exists to conduct active space defense operations; the ability to destroy possible threats from space is limited to attacks against ground-based support and launch infrastructures. Other CINCs will conduct these coordinated offensive missions in support of aerospace defense.

a. **Active Space Defense Targets and Resources. No known operational space-based weapon systems exist that can attack North America.** The principal threat from space comes from systems such as C4I, navigation, weather, surveillance, and reconnaissance satellites. These systems are used mostly to enhance enemy operations by providing effective support throughout the

THE U-2 "MILK RUN"

Events in the Caribbean took a dramatic turn on 14 October 1962, when American aircraft resumed flights over Cuba rather than around the island's periphery. For the first time, US Air Force U-2s were involved. Major Richard S. Heyser, one of the only two Air Force pilots checked out on the CIA-modified U-2, took off from Edwards Air Force Base, California, flew over western Cuba, and landed at McCoy Air Force Base, Florida. Having encountered no MIGs or SAM activity over the communist island, when the major landed he described the mission as "a milk run."

Ground crews removed the film from his aerial camera and put it on a plane bound for Washington. Navy specialists processed the film and the following day took it to the CIA's National Photographic Interpretation Center (NPIC) for analysis.

In the afternoon, following many hours of close scrutiny, members of the joint-Service and CIA team made a discovery that immediately turned the routine "milk run" mission into an intelligence coup. The photo interpreters discovered a new missile site meant for Soviet SS-4 MRBMs — offensive weapons capable of incinerating American cities and the people in them. Art Lundahl, NPICs director, passed the information to his superiors at CIA headquarters, who in turn alerted National Security Advisor McGeorge Bundy. He immediately arranged a meeting with the President at the White House for the next morning, 16 October 1962.

Beginning just before noon, Lundahl briefed the President and his chief national security advisors. He used the photos to identify and describe the MRBM site located two days before. Based on additional analysis completed by the photo interpreters the night before, Lundahl also pointed out another MRBM site and another installation whose weapons could not yet be determined. President Kennedy listened to the presentation calmly. But according to Army General Maxwell D. Taylor, only recently appointed Chairman of the Joint Chiefs of Staff, the President displayed a "rather deep but controlled anger at the duplicity of the Soviet officials who had tried to deceive him." The Cuban Missile Crisis had begun in earnest.

SOURCE: Utz, Curtis A., Cordon of Steel: The USN and the Cuban Missile Crisis, Naval Historical Center, 1993

range of military operations. They also give the enemy increased responsiveness to operational requirements.

b. **Active Space Defense Missions and Tasks.** To the extent an ABM system is used to destroy space-based weapons, there could be ABM Treaty compliance issues. However, there are currently no specific treaty prohibitions against anti-satellite weapons. Possible mission areas for active space defense could include area and point defense. These mission areas could be conducted using surface-, air-, or space-based weapon systems.

6. Execution and Integration of Aerospace Defense Operations

The successful execution of aerospace defense of North America requires an integrated structure of global warning and surveillance systems, engagement systems (e.g., missiles, aircraft), and C4I systems. All elements are highly interdependent and loss of any element may seriously degrade the overall aerospace defense capability. All units should be prepared to defend against enemy attack using organic weapons and passive measures. Joint and binational forces should integrate all aerospace defense efforts. CINCNORAD assigns tasks, designates objectives, and issues directives concerning NORAD operational matters. Execution of aerospace defense operations requires a strategic surveillance and tactical warning system capable of near-real-time production and dissemination of tracking data necessary for the effective engagement of targets. Track production is a sequential process that begins with the surveillance function. As a track is detected, friendly forces should identify and label it and distribute the information as rapidly as possible. The track data should be sufficiently detailed and timely to permit the appropriate commanders to evaluate the track, determine the significance of the threat, and either designate forces for engagement, advise units of the passage of friendly aircraft, or advise units of incoming threats. Once an intercept has occurred, a damage assessment should be made to determine if the threat was destroyed or if further engagements are needed. **The timely engagement of any threat requires the establishment and understanding of published ROE.** Unless already established by US and Canadian Governments or an existing plan, **CINCNORAD is responsible for establishing and implementing these rules.** Regional commanders, sector commanders, and other NORAD supporting commanders ensure compliance with the established ROE. The optimum employment of weapon systems requires early separation of friend and foe to maximize the engagement as far from North America as possible while avoiding fratricide.

a. **Aerospace Defense Weapons Control. Weapon systems should be capable of autonomous operations if positive control fails or is not available.** In the absence of positive control, procedural means are used to permit the safe passage of friendly aircraft and the effective use of aerospace defense weapons. Integration, coordination, and airspace defense procedures are needed to enhance the synergistic capabilities of the various defense weapon systems. **Weapon control zones include fighter engagement zones and missile engagement zones.** These zones are defined as dimensions of airspace in which the responsibility for engagement rests with a particular weapon system. **The ideal aim of weapon control zones, based on target signature technology, is to have a joint engagement zone where all surface, air, and space defense systems can be employed and operated simultaneously in the same airspace.** The target signature technologies should allow for the identification of all airborne targets: friendly, neutral, and hostile. Targets positively identified as hostile will be engaged. This should reduce fratricide and relax stringent airspace control procedures. ROE should also

be simplified, giving air defense systems the flexibility to operate beyond the current constraints of procedural control measures.

b. **Aerospace Defense Weapons Employment.** Aerospace defense weapon systems and forces are composed of many diverse elements. They perform a variety of tasks to accomplish a common mission through a single, integrated system. Each weapon system should be controlled and employed in a manner that makes best use of its inherent capabilities. The engagement process should be continuous. **Aerospace defense should provide a multi-layered defense to intercept intruding enemy threats as early as possible, as far forward as feasible, and as many times as needed to ensure attrition of the threats.** The lethality of some weapons (NBC and high-yield conventional weapons) dictates the need to prevent these deadly weapons from detonating on or over North America. Early warning of enemy attack is vital to obtaining a layered defense. Appropriate weapon systems will be deployed to the periphery of the continent to deter, to provide ITW/AA, and to form a layered defense against air-breathing threats to North America. **Effective defense depends on enhanced surveillance and detection capabilities.** Providing timely information on threat parameters and target data to systems capable of attacking and destroying hostile threats will also enhance aerospace defense. This layered defense should be capable of passing threats from one engagement system, region, or sector to another while preventing fratricide and loss of the detected threat from the tracking system. Available weapons should be assigned to inbound threats before any assignment to outbound threats. Weapon systems should be employed as follows:

- **Aircraft. Missions may be assigned or committed in response to the detection and assessment of a hostile, potentially hostile, or unknown target.** When possible, aircraft will remain under the control of the initiating control agency, although this control may be transferred to adjacent regions or sectors if required.

- **Surface-to-Air Weapons.** The effectiveness of surface-to-air weapons depends on a highly reliable, automated ballistic missile C4I and an adequate identification process to preclude engagement of friendly aircraft and unnecessary expenditure of aerospace defense resources. Weapons control status (weapons free, weapons tight, and weapons hold), weapon engagement zones, and ROE are used to control surface-to-air engagements. **Available surface-to-air defense assets are incorporated in the overall defense plan and subjected to the integrated procedures and weapons control measures of CINCNORAD.** It is normally difficult to centrally control all short-range air defense units; some control should be available through ROE and procedures established by CINCNORAD. However, no ROE or procedure should deny the right of self-defense to any defensive force or system. **Surface-to-air weapons are employed either in area or point defense operations.** These weapons potentially offer large amounts of firepower and instant responsiveness. Through integration, the surface-to-air systems achieve mutual support and provide the most effective coverage. Coordination should ensure the minimum risk to friendly aircraft and the means to deconflict surface-to-air weapons and other defense weapons.

- **Space-based Weapons. There are no operational space-based weapons.** Space-based weapons capable of countering long-range ballistic missiles are banned by the ABM Treaty. US ability to effectively employ defensive

weapons against possible space threats is limited. Space-based systems continue to function primarily to enhance all other aerospace defense operations.

- **Surface, Air, and Space C4I Systems.** C4I systems should integrate and coordinate all aerospace defense mission areas and link their active and passive operations. **Commanders apply C4I systems to plan, coordinate, and deconflict integrated aerospace defense operations, to detect and assess threats, and to employ the appropriate forces to defeat the threats.** C4I allows implementation and direction of these forces to execute active air, ballistic missile, and space defense. These systems also permit effective passive defense by assessing the attacks directing suitable defensive measures and disseminate timely warning and attack operations targeting information to affected CINCs and joint force commanders. They allow the timely transmission of guidance, direction, and application of weapon systems in a critical, time-sensitive environment. C4I systems should provide characterization of an attack to include launch location, predicted impact point and time, and proposed response based on the attack characterization. They should also provide near-real-time feedback on the negation of attacking forces to appropriately adjust responses.

7. Contribution of Other Forces and Support Operations

Aerospace defense requires the use of surface, air, and space assets. The capabilities and limitations of different systems are governed by such factors as range, payload, weapons carriage, night, all-weather capability, self-defense capability, and crew qualification. However, planning for aerospace defense operations should not be limited to those primary systems used to intercept and destroy hostile weapons. **The successful conduct of these operations requires the exploitation and integration of many support systems from different components.** Operational procedures, equipment compatibility, and C2 architecture should be exercised and standardized among the binational forces and Services. **As shown in Figure III-2, to ensure success, aerospace defense should be supported with supplementary systems, measures, and operations.**

a. **Air-to-Air Refueling. Air-to-air refueling enables aircraft to extend their range and endurance.** This allows aircraft to intercept enemy threats at greater ranges from North America, in greater numbers, with higher weapons loads, and for extended periods of time.

b. **Surveillance and Reconnaissance.** Surveillance and reconnaissance capabilities play a critical role in the planning and execution of aerospace defense operations. Collected information, when analyzed, provides overall situational awareness, helps commanders identify and assess enemy attacks, helps formulate objectives, and supports friendly forces. **Surveillance and reconnaissance capabilities collect information that feeds and sustains the execution of aerospace defense by providing timely surface-, air-, and space-focused information and weather data to combat planners and combat operations.** Air- and space-based surveillance and reconnaissance capabilities are required for accurate, real-time, and tailored intelligence necessary to apply aerospace defense assets effectively.

c. **Logistics and Support Agencies.** Military power achieves its full potential when operations and logistics harmonize to maximize mission effectiveness. **Logistics and support are vital to maintain and**

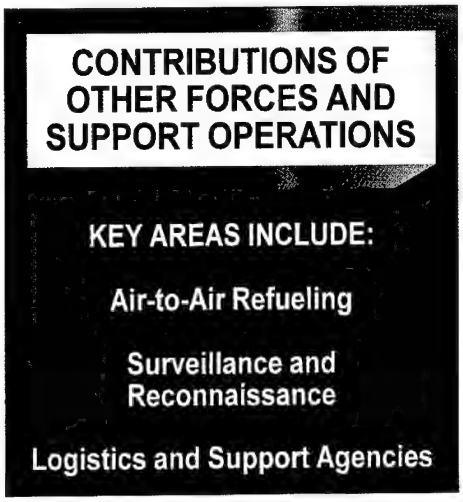


Figure III-2. Contributions of Other Forces and Support Operations

sustain any successful aerospace defense operation and should be integral to the planning process at all levels. Commanders should consider all aspects of required support, including such elements as maintenance planning; manpower and personnel; supply support; support equipment; technical data; security; training; computer resources; facilities; packaging, handling, storage, and transportation; and design interface.

APPENDIX A
REFERENCES

The development of Joint Pub 3-01.1 is based upon the following primary references.

1. Joint Pub 0-2, "Unified Action Armed Forces (UNAAF)."

2. Joint Pub 1-01, Change 1, "Joint Publication System, Joint Doctrine and Joint Tactics, Techniques, and Procedures Development Program."

3. Joint Pub 1-02, "Department of Defense Dictionary of Military and Associated Terms."

4. Joint Pub 2-0, "Joint Doctrine for Intelligence Support to Operations."

5. Joint Pub 2-01, "Joint Intelligence Support to Military Operations." (In Development)

6. Joint Pub 3-0, "Doctrine for Joint Operations."

7. Joint Pub 3-01, "Joint Doctrine for Countering Air and Missile Threats." (In Development)

8. Joint Pub 3-01.2, "Joint Doctrine for Theater Counterair Operations."

9. Joint Pub 3-01.5, "Doctrine for Joint Theater Missile Defense."

10. Joint Pub 3-14, "Joint Doctrine; Tactics, Techniques, and Procedures for Space Operations." (In Development)

11. Joint Pub 3-51, "Electronic Warfare in Joint Military Operations."

12. Joint Pub 3-52, "Doctrine for Joint Airspace Control in the Combat Zone."

13. Joint Pub 3-56.1, "Command and Control for Joint Air Operations."

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20. JFACC Primer.

21. National Security Strategy.

22. 1991 NORAD Agreement and NORAD Terms of Reference.

23. 1993 NORAD C4 Systems Master Plan. (SECRET)

24. NORAD Strategy Review Final Report, July 1992. (SECRET)

25. NORAD/USSPACECOM Ballistic Missile Defense Concept of Operations, Vol. II, 20 December 1993. (SECRET)

26. NORAD/USSPACECOM Ballistic Missile Defense Concept of Operations, Vol. III, 20 December 1993. (SECRET)

APPENDIX B
ADMINISTRATIVE INSTRUCTIONS

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Users in the field are highly encouraged to submit comments on this publication to the Joint Warfighting Center, Attn: Doctrine Division, Fenwick Road, Bldg 96, Fort Monroe, VA 23651-5000. These comments should address content (accuracy, usefulness, consistency, and organization), writing, and appearance.

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GLOSSARY

PART I—ABBREVIATIONS AND ACRONYMS

ABM	antiballistic missile
BMD	ballistic missile defense
C2	command and control
C4	command, control, communications, and computers
C4I	command, control, communications, computers, and intelligence
CCD	camouflage, concealment, and deception
CDRUSELEMNORAD	Commander, United States Element, North American Aerospace Defense Command
CIC	Combined Intelligence Center
CINC	commander of a combatant command
CINCNORAD	Commander in Chief, North American Aerospace Defense Command
CMOC	Cheyenne Mountain Operations Center
COCOM	combatant command (command authority)
CONUS	continental United States
DEFCON	defense readiness condition
ITW/AA	integrated tactical warning/attack assessment
JFC	joint force commander
JTTP	joint tactics, techniques, and procedures
NBC	nuclear, biological, and chemical
NCA	National Command Authorities
NDOC	National Defense Operations Center
NMCC	National Military Command Center
NORAD	North American Aerospace Defense Command
OPCON	operational control
OPSEC	operations security
RAOC	regional air operations center
ROE	rules of engagement
SAOC	sector air operations center
TACON	tactical control
USCINCSPACE	Commander in Chief, United States Space Command
WMD	weapons of mass destruction

PART II—TERMS AND DEFINITIONS

active air defense. Direct defensive action taken to destroy, nullify, or reduce the effectiveness of hostile air action. It includes the use of aircraft, air defense weapons, electronic warfare, and other available weapons not primarily used in an air defense role. See also air defense. (This term and its definition are provided for information and are proposed for inclusion in the next edition of Joint Pub 1-02 by Joint Pub 3-01.)

active defense. The employment of limited offensive action and counterattacks to deny a contested area or position to the enemy. See also passive defense. (Joint Pub 1-02)

aerospace. Of, or pertaining to, Earth's envelope of atmosphere and the space above it; two separate entities considered as a single realm for activity in launching, guidance, and control of vehicles that will travel in both entities. (Joint Pub 1-02)

aerospace control operations. The employment of air forces, supported by ground and naval forces, as appropriate, to achieve military objectives in vital aerospace areas. Such operations include destruction of enemy aerospace and surface-to-air forces, interdiction of enemy aerospace operations, protection of vital air lines of communication, and the establishment of local military superiority in areas of air operations. (Joint Pub 1-02)

aerospace defense. 1. All defensive measures designed to destroy or nullify attacking enemy aircraft and missiles and also negate hostile space systems. 2. An inclusive term encompassing air defense, ballistic missile defense, and space defense. (This term and its definition modifies the existing term and its definition and is approved for inclusion in the next edition of Joint Pub 1-02.)

air defense. All defensive measures designed to destroy, nullify, or reduce the effectiveness of attacking enemy aircraft or missiles. See also active air defense; aerospace defense; passive air defense. (This term and its definition are provided for information and are proposed for inclusion in the next edition of Joint Pub 1-02 by Joint Pub 3-01.)

air defense action area. An area and the airspace above it within which friendly aircraft or surface-to-air weapons are normally given precedence in operations except under specified conditions. Also see air defense operations area. (Joint Pub 1-02)

air defense area. 1. overseas — A specifically defined airspace for which air defense must be planned and provided. 2. United States — Airspace of defined dimensions designated by the appropriate agency within which the ready control of airborne vehicles is required in the interest of national security during an air defense emergency. (Joint Pub 1-02)

air defense artillery. Weapons and equipment for actively combating air targets from the ground. (Joint Pub 1-02)

air defense battle zone. A volume of airspace surrounding an air defense fire unit or defended area, extending to a specified altitude and range, in which the fire unit commander will engage and destroy targets not identified as friendly under criteria established by higher headquarters. (Joint Pub 1-02)

air defense control center. The principal information, communications, and operations center from which all aircraft, antiaircraft operations, air defense artillery, guided missiles, and air warning functions

of a specific area of air defense responsibility are supervised and coordinated. Also called air defense operations center. (Joint Pub 1-02)

air defense division. A geographic subdivision of an air defense region. Also see air defense sector. (Joint Pub 1-02)

air defense emergency. An emergency condition, declared by the Commander in Chief, North American Aerospace Defense Command, that exists when attack upon the continental United States, Alaska, Canada, or United States installations; in Greenland by hostile aircraft or missiles is considered probable, is imminent, or is taking place. (Joint Pub 1-02)

air defense identification zone. Airspace of defined dimensions within which the ready identification, location, and control of airborne vehicles are required. Also called ADIZ. Also see air defense operations area. (Joint Pub 1-02)

air defense operations area. An area and the airspace above it within which procedures are established to minimize mutual interference between air defense and other operations; it may include designation of one or more of the following: air defense action area, air defense area; air defense identification zone, and/or firepower umbrella. (Joint Pub 1-02)

air defense region. A geographical subdivision of an air defense area. (Joint Pub 1-02)

air defense sector. A geographical subdivision of an air defense region. Also see air defense division. (Joint Pub 1-02)

air sovereignty. A nation's inherent right to exercise absolute control and authority over the airspace above its territory. Also see air sovereignty mission. (Joint Pub 1-02)

air sovereignty mission. The integrated tasks of surveillance and control, the execution of which enforces a nation's authority over its territorial airspace. Also see air sovereignty. (Joint Pub 1-02)

airspace control in the combat zone. A process used to increase combat effectiveness by promoting the safe, efficient, and flexible use of airspace. Airspace control is provided in order to prevent fratricide, enhance air defense operations, and permit greater flexibility of operations. Airspace control does not infringe on the authority vested in commanders to approve, disapprove, or deny combat operations. Also called combat airspace control; airspace control. (Joint Pub 1-02)

airspace control sector. A subelement of the airspace control area, established to facilitate the control of the overall area. Airspace control sector boundaries normally coincide with air defense organization subdivision boundaries. Airspace control sectors are designated in accordance with procedures and guidance contained in the airspace control plan in consideration of Service component, host nation, and allied airspace control capabilities and requirements. (Joint Pub 1-02)

area air defense commander. Within a unified command, subordinate unified command, or joint task force, the commander will assign overall responsibility for air defense to a single commander. Normally, this will be the component commander with the preponderance of air defense capability and the command, control, and communications capability to plan and execute integrated air defense operations. Representation from the other components involved will be provided, as appropriate, to the area air defense commander's

headquarters. Also called AADC. (Joint Pub 1-02)

autonomous operation. In air defense, the mode of operation assumed by a unit after it has lost all communications with higher echelons. The unit commander assumes full responsibility for control of weapons and engagement of hostile targets. (Joint Pub 1-02)

boost phase. That portion of the flight of a ballistic missile or space vehicle during which the booster and sustainer engines operate. Also see midcourse phase; reentry phase; terminal phase. (Joint Pub 1-02)

broadcast-controlled air interception. An interception in which the interceptor is given a continuous broadcast of information concerning an enemy raid and effects interception without further control. (Joint Pub 1-02)

centralized control. In air defense, the control mode whereby a higher echelon makes direct target assignments to fire units. See also decentralized control. (Joint Pub 1-02)

close-controlled air interception. An interception in which the interceptor is continuously controlled to a position from which the target is within visual range or radar contact. (Joint Pub 1-02)

decentralized control. In air defense, the normal mode whereby a higher echelon monitors unit actions, making direct target assignments to units only when necessary to ensure proper fire distribution or to prevent engagement of friendly aircraft. See also centralized control. (Joint Pub 1-02)

midcourse phase. That portion of the trajectory of a ballistic missile between the boost phase and the reentry phase. Also see boost phase; reentry phase; terminal phase. (Joint Pub 1-02)

passive air defense. All measures, other than active air defense, taken to minimize the effectiveness of hostile air action. These measures include camouflage, deception, dispersion, and the use of protective construction. See also aerospace defense. (Joint Pub 1-02)

passive defense. Measures taken to reduce the probability of and to minimize the effects of damage caused by hostile action without the intention of taking the initiative. See also active defense. (Joint Pub 1-02)

point defense. The defense or protection of special vital elements and installations; e.g., command and control facilities, air bases. (Joint Pub 1-02)

positive control. A method of airspace control which relies on positive identification, tracking, and direction of aircraft within an airspace, conducted with electronic means by an agency having the authority and responsibility therein. (Joint Pub 1-02)

reentry phase. That portion of the trajectory of a ballistic missile or space vehicle where there is a significant interaction of the vehicle and the Earth's atmosphere. Also see boost phase; midcourse phase; terminal phase. (Joint Pub 1-02)

space defense. All defensive measures designed to destroy attacking enemy vehicles (including missiles) while in space, or to nullify or reduce the effectiveness of such attack. See also aerospace defense. (Joint Pub 1-02)

terminal phase. That portion of the trajectory of a ballistic missile between reentry into the atmosphere or the end of the mid-course phase and impact or arrival in the vicinity of the target. Also see boost phase; midcourse phase; reentry phase. (Joint Pub 1-02)

weapon engagement zone. In air defense, airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with a particular weapon system. Also called WEZ. a. fighter engagement zone. In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with fighter aircraft. Also called FEZ. b. high-altitude missile engagement zone. In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with high-altitude surface-to-air missiles. Also called HIMEZ. c. low-altitude missile engagement zone. In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with low- to medium-altitude surface-to-air missiles. Also called LOMEZ. d. short-range air defense engagement zone. In air defense, that airspace of defined dimensions within which the responsibility for engagement of air threats normally rests with short-range air defense weapons. It may be established within a low- or high-altitude missile engagement zone. Also called SHORADEZ. e. joint engagement zone. In air defense, that airspace of defined dimensions within which multiple air defense systems (surface-to-air missiles and aircraft) are simultaneously employed to engage air threats. Also called JEZ. (Joint Pub 1-02)

weapons assignment. In air defense, the process by which weapons are assigned to individual air weapons controllers for use in accomplishing an assigned mission. (Joint Pub 1-02)

weapons free. In air defense, a weapon control order imposing a status whereby weapons systems may be fired at any target not positively recognized as friendly. See also weapons hold; weapons tight. (Joint Pub 1-02)

weapons hold. In air defense, a weapon control order imposing a status whereby weapons systems may only be fired in self-defense or in response to a formal order. See also weapons free; weapons tight. (Joint Pub 1-02)

weapons tight. In air defense, a weapon control order imposing a status whereby weapons systems may be fired only at targets recognized as hostile. See also weapons free; weapons hold. (Joint Pub 1-02)

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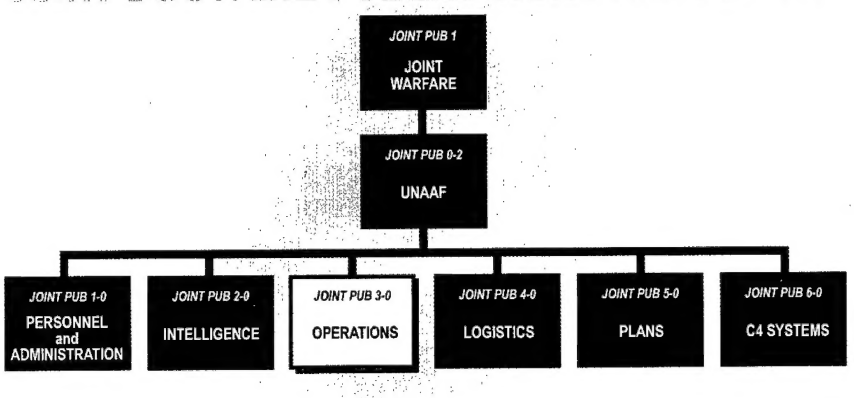

All joint doctrine and tactics, techniques, and procedures are organized into a comprehensive hierarchy as shown in the chart above. **Joint Pub 3-01.1** is in the **Operations** series of joint doctrine publications. The diagram below illustrates an overview of the development process: